

Appl. No. 09/359,599  
Amdt dated January 7, 2004  
Reply to Final Office Action of October 7, 2003

**Amendments to the Claims:**

Please replace claims 1, 10, and 19 and cancel claims 9, 18, and 27 as shown below. All pending claims are reproduced below.

1. (Currently Amended) A method for computing a diversity measure for a ~~predetermined combinatorial structure group of web pages~~ group of web pages, C, having  $n$  elements, wherein the diversity measure indicates a level of diversity for the group of web pages, the method comprising steps of:

- (a) identifying  $M$  substructures  $c_1$  through  $c_M$  each having  $m$  elements from among the  $n$  elements of the ~~predetermined combinatorial structure group of web pages~~ group of web pages C, where  $M$  equals  $n! / [(n-m)! m!]$ ;
- (b) for each substructure  $c_i$ , for  $i$  from 1 to  $M$ , determining a number  $n_i$  of the  $M$  substructures  $c_1$  through  $c_M$  that are similar to the substructure  $c_i$ ; and
- (c) computing a first entropy  $\Phi(m)$  based upon all the numbers  $n_i$  computed during step (b) and based upon  $M$  in computed step (a);

2. (Original) A method as in claim 1, further comprising the steps of:

- (d) repeating steps (a) and (b) with  $m+1$  substituted for  $m$ ;
- (e) computing a second entropy  $\Phi(m+1)$  based upon all the numbers  $n_i$  and  $M$  computed during step (d); and
- (f) subtracting the second entropy  $\Phi(m+1)$  from the first entropy  $\Phi(m)$  to produce the diversity measure.

3. (Original) A method as in claim 2, wherein steps (c) and (e) comprise the steps of:

for each  $i$  from 1 to  $M$ :

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computing a fraction  $F_i$  by dividing  $n_i$  by  $M$ ; and

computing a logarithm of fraction  $F_i$ ;

computing a sum by adding all logarithms of fractions  $F_i$  for  $i$  from 1 to  $M$ ; and

dividing the sum by  $M$ .

4. (Original) A method as in claim 2, wherein step (b) comprises the steps of, for each substructure  $c_i$  for  $i$  from 1 to  $M$ :

for each substructure  $c_j$  for  $j$  from 1 to  $M$ :

computing a distance function  $d(c_i, c_j)$  representing a measure of a difference between substructure  $c_i$  and substructure  $c_j$ ;

comparing the distance function  $d(c_i, c_j)$  to a threshold; and

determining the substructures  $c_i$  and  $c_j$  to be similar if and only if the distance function  $d(c_i, c_j)$  is less than the threshold.

5. (Original) A method as in claim 2, wherein steps (c) and (e) comprise the steps of:

for each distinct substructure  $c_i$ :

computing a frequency  $f_i$  by dividing  $n_i$  by  $M$ ;

computing a logarithm of frequency  $f_i$ ; and

computing a product by multiplying the frequency  $f_i$  and the logarithm of frequency  $f_i$ ; and

computing a sum by adding all products of the frequencies  $f_i$  and the logarithms of frequencies  $f_i$ .

6. (Original) A method as in claim 2, wherein step (b) comprises the steps of:

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for each substructure  $c_i$  for  $i$  from 1 to  $M$ :

monotonically renumbering  $m$  elements of  $c_i$  from 1 to  $m$ ; and

for each substructure  $c_j$  for  $j$  from 1 to  $M$ :

monotonically renumbering  $m$  elements of  $c_j$  from 1 to  $m$ ; and

determining the substructures  $c_i$  and  $c_j$  to be similar if and only if they are identical.

7. (Original) A method as in claim 2, wherein step (b) comprises the steps of:

for each substructure  $c_i$  for  $i$  from 1 to  $M$ :

monotonically renumbering  $m$  elements of  $c_i$  from 1 to  $m$ ; and

for each substructure  $c_j$  for  $j$  from 1 to  $M$ :

monotonically renumbering  $m$  elements of  $c_j$  from 1 to  $m$ ; and

determining the substructures  $c_i$  and  $c_j$  to be similar if and only if they are identical or isomorphic.

8. (Original) A method as in claim 2, wherein steps (c) and (e) comprise the steps of:

for each distinct substructure  $c_i$ :

computing a frequency  $f_i$  by dividing  $n_i$  by  $M$ ;

computing a quotient by dividing the frequency  $f_i$  by an expected frequency  $p_i$ ;

computing a logarithm of quotient  $q_i$ ; and

computing a product by multiplying the frequency  $f_i$  and the logarithm of quotient  $q_i$ ; and

computing a sum by adding all products of the frequencies  $f_i$  and the logarithms of quotients  $q_i$ .

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9. (Canceled)

10. (Currently Amended) A computer readable storage medium, comprising:

computer readable program code embodied on said computer readable storage medium, said computer readable program code for programming a computer to perform a method for computing a diversity measure for a predetermined combinatorial structure group of web pages, C, having  $n$  elements, wherein the diversity measure indicates a level of diversity for the group of web pages, the method comprising steps of:

- (a) identifying  $M$  substructures  $c_1$  through  $c_M$  each having  $m$  elements from among the  $n$  elements of the predetermined combinatorial structure group of web pages C, where  $M$  equals  $n! / [(n-m)! m!]$ ;
- (b) for each substructure  $c_i$ , for  $i$  from 1 to  $M$ , determining a number  $n_i$  of the  $M$  substructures  $c_1$  through  $c_M$  that are similar to the substructure  $c_i$ ; and
- (c) computing a first entropy  $\Phi(m)$  based upon all the numbers  $n_i$  computed during step (b) and based upon  $M$  in computed step (a);

11. (Original) A computer readable storage medium as in claim 10, the method further comprising the steps of:

- (d) repeating steps (a) and (b) with  $m+1$  substituted for  $m$ ;
- (e) computing a second entropy  $\Phi(m+1)$  based upon all the numbers  $n_i$  and  $M$  computed during step (d); and
- (f) subtracting the second entropy  $\Phi(m+1)$  from the first entropy  $\Phi(m)$  to produce the diversity measure.

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12. (Original) A computer readable storage medium as in claim 11, wherein steps (c) and (e) comprise the steps of:

for each  $i$  from 1 to  $M$ :

computing a fraction  $F_i$  by dividing  $n_i$  by  $M$ ; and

computing a logarithm of fraction  $F_i$ ;

computing a sum by adding all logarithms of fractions  $F_i$  for  $i$  from 1 to  $M$ ; and

dividing the sum by  $M$ .

13. (Original) A computer readable storage medium as in claim 11, wherein step (b) comprises the steps of, for each substructure  $c_i$  for  $i$  from 1 to  $M$ :

for each substructure  $c_j$  for  $j$  from 1 to  $M$ :

computing a distance function  $d(c_i, c_j)$  representing a measure of a difference between substructure  $c_i$  and substructure  $c_j$ ;

comparing the distance function  $d(c_i, c_j)$  to a threshold; and

determining the substructures  $c_i$  and  $c_j$  to be similar if and only if the distance function  $d(c_i, c_j)$  is less than the threshold.

14. (Original) A computer readable storage medium as in claim 11, wherein steps (c) and (e) comprise the steps of:

for each distinct substructure  $c_i$ :

computing a frequency  $f_i$  by dividing  $n_i$  by  $M$ ;

computing a logarithm of frequency  $f_i$ ; and

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computing a product by multiplying the frequency  $f_i$  and the logarithm of frequency  $f_i$ ; and  
computing a sum by adding all products of the frequencies  $f_i$  and the logarithms of frequencies  $f_i$ .

15. (Original) A computer readable storage medium as in claim 11, wherein step (b) comprises the steps of:

for each substructure  $c_i$  for  $i$  from 1 to  $M$ :

monotonically renumbering  $m$  elements of  $c_i$  from 1 to  $m$ ; and

for each substructure  $c_j$  for  $j$  from 1 to  $M$ :

monotonically renumbering  $m$  elements of  $c_j$  from 1 to  $m$ ; and

determining the substructures  $c_i$  and  $c_j$  to be similar if and only if they are identical.

16. (Original) A computer readable storage medium as in claim 11, wherein step (b) comprises the steps of:

for each substructure  $c_i$  for  $i$  from 1 to  $M$ :

monotonically renumbering  $m$  elements of  $c_i$  from 1 to  $m$ ; and

for each substructure  $c_j$  for  $j$  from 1 to  $M$ :

monotonically renumbering  $m$  elements of  $c_j$  from 1 to  $m$ ; and

determining the substructures  $c_i$  and  $c_j$  to be similar if and only if they are identical or isomorphic.

17. (Original) A computer readable storage medium as in claim 11, wherein steps (c) and (e) comprise the steps of:

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for each distinct substructure  $c_i$ :

computing a frequency  $f_i$  by dividing  $n_i$  by  $M$ ;

computing a quotient by dividing the frequency  $f_i$  by an expected frequency  $p_i$ ;

computing a logarithm of quotient  $q_i$ ; and

computing a product by multiplying the frequency  $f_i$  and the logarithm of quotient  $q_i$ ; and

computing a sum by adding all products of the frequencies  $f_i$  and the logarithms of quotients  $q_i$ .

18. (Canceled)

19. (Currently Amended) A computer system, comprising:

a processor; and

a processor readable storage medium coupled to the processor having processor readable program code embodied on said processor readable storage medium, said processor readable program code for programming the computer system to perform a method for computing a diversity measure for a ~~predetermined combinatorial structure group of web pages~~,  $C$ , having  $n$  elements, wherein the diversity measure indicates a level of diversity for the group of web pages, the method comprising steps of:

(a) identifying  $M$  substructures  $c_1$  through  $c_M$  each having  $m$  elements from among the  $n$  elements of the ~~predetermined combinatorial structure group of web pages~~  $C$ , where  $M$  equals  $n! / [(n-m)! m!]$ ;

(b) for each substructure  $c_i$ , for  $i$  from 1 to  $M$ , determining a number  $n_i$  of the  $M$  substructures  $c_1$  through  $c_M$  that are similar to the substructure  $c_i$ ; and

(c) computing a first entropy  $\Phi(m)$  based upon all the numbers  $n_i$  computed during step (b) and based upon  $M$  in computed step (a);

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20. (Original) A computer system as in claim 19, the method further comprising the steps of:
- (d) repeating steps (a) and (b) with  $m+1$  substituted for  $m$ ;
  - (e) computing a second entropy  $\Phi(m+1)$  based upon all the numbers  $n_i$  and  $M$  computed during step (d);
- and
- (f) subtracting the second entropy  $\Phi(m+1)$  from the first entropy  $\Phi(m)$  to produce the diversity measure.
21. (Original) A computer system as in claim 20, wherein steps (c) and (e) comprise the steps of:
- for each  $i$  from 1 to  $M$ :
- computing a fraction  $F_i$  by dividing  $n_i$  by  $M$ ; and
  - computing a logarithm of fraction  $F_i$ ;
- computing a sum by adding all logarithms of fractions  $F_i$  for  $i$  from 1 to  $M$ ; and
- dividing the sum by  $M$ .
22. (Original) A computer system as in claim 20, wherein step (b) comprises the steps of, for each substructure  $c_i$  for  $i$  from 1 to  $M$ :
- for each substructure  $c_j$  for  $j$  from 1 to  $M$ :
- computing a distance function  $d(c_i, c_j)$  representing a measure of a difference between substructure  $c_i$  and substructure  $c_j$ ;
  - comparing the distance function  $d(c_i, c_j)$  to a threshold; and
  - determining the substructures  $c_i$  and  $c_j$  to be similar if and only if the distance function  $d(c_i, c_j)$  is less than the threshold.



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23. (Original) A computer system as in claim 20, wherein steps (c) and (e) comprise the steps of:

for each distinct substructure  $c_i$ :

computing a frequency  $f_i$  by dividing  $n_i$  by  $M$ ;

computing a logarithm of frequency  $f_i$ ; and

computing a product by multiplying the frequency  $f_i$  and the logarithm of frequency  $f_i$ ; and

computing a sum by adding all products of the frequencies  $f_i$  and the logarithms of frequencies  $f_i$ .

24. (Original) A computer system as in claim 20, wherein step (b) comprises the steps of:

for each substructure  $c_i$  for  $i$  from 1 to  $M$ :

monotonically renumbering  $m$  elements of  $c_i$  from 1 to  $m$ ; and

for each substructure  $c_j$  for  $j$  from 1 to  $M$ :

monotonically renumbering  $m$  elements of  $c_j$  from 1 to  $m$ ; and

determining the substructures  $c_i$  and  $c_j$  to be similar if and only if they are identical.

25. (Original) A computer system as in claim 20, wherein step (b) comprises the steps of:

for each substructure  $c_i$  for  $i$  from 1 to  $M$ :

monotonically renumbering  $m$  elements of  $c_i$  from 1 to  $m$ ; and

for each substructure  $c_j$  for  $j$  from 1 to  $M$ :

monotonically renumbering  $m$  elements of  $c_j$  from 1 to  $m$ ; and

determining the substructures  $c_i$  and  $c_j$  to be similar if and only if they are identical or isomorphic.

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26. (Original) A computer system as in claim 20, wherein steps (c) and (e) comprise the steps of:

for each distinct substructure  $c_i$ :

computing a frequency  $f_i$  by dividing  $n_i$  by  $M$ ;

computing a quotient by dividing the frequency  $f_i$  by an expected frequency  $p_i$ ;

computing a logarithm of quotient  $q_i$ ; and

computing a product by multiplying the frequency  $f_i$  and the logarithm of quotient  $q_i$ ; and

computing a sum by adding all products of the frequencies  $f_i$  and the logarithms of quotients  $q_i$ .

27. (Canceled)